

## Quality of nursing care in the labor wards of selected hospitals in Egypt

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**Abstract:** Measuring quality is an important tool in assessing compliance with standards particularly that the efforts to measure quality of nursing care and nursing service are very limited. The aim of this study was to measure the quality of nursing care in the labor wards of selected hospitals in Egypt. This record-based study was carried out in the labor wards of five hospitals in Egypt representing various sectors of health care system during the period from 2001 to 2010. Data collection sheets were used data about the Adverse Outcomes Index indicators giving the Weighted Adverse Outcome Score (WAOS), and other data about the setting such as nursing staff and physicians. The fieldwork lasted from July to December 2013. The results demonstrated a wide variation in the WAOS of the five study hospitals, as well as the birth trauma rates and the rates of perineal tear during the study period. Statistically significant moderate positive correlations were revealed between WAOS scores and the number of nurses/woman, and the number of physicians/woman, but a negative correlation with the nurse/physician ratio. It also had a statistically significant weak negative correlation with the percent of staff nurses to total nurses. In conclusion, the quality of care provided to parturient women is better in University and Teaching hospitals compared to the general hospitals affiliated to the MOH. An adequate staff mix is important in improving the quality of service, with lower rates of birth trauma and perineal tear. It is recommended that the hospitals increase their nurse/physician ratios, and to have suitable percentages of junior nurses and physicians compared to senior staff.

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**Key words:** Quality care, Obstetric and Gynecological Nursing, Labor wards, Weighted Adverse Outcome Score

### 1. Introduction

Quality is defined as the degree to which health services respond to the needs of individuals and the population, increases the likelihood of desired health outcomes, and is consistent with current professional knowledge (*Liu et al., 2008*). In nursing, quality is described as the process of attaining of the highest degree of excellence in the delivery of patients' care (*Mpsarros, 2009*). The goals of measuring health care quality are to determine the effects of health care on desired outcomes and to assess the degree to which health care adheres to process based on scientific evidence or accepted by professional consensus and is consistent with patient preferences (*Varkey et al., 2008*).

A number of factors influence the quality of health care. These include insufficient resources and lack of nursing care records (*Patrica and Cerrell, 2005*), personnel problems as the lack of trained, skilled and motivated staff, and lack of good and hospital information system (*Soeka, 2007*), improper maintenance (*Diprete et al., 2010*), in addition to lack of good supervision, lack of policy and administrative manuals and of written job description, and absence of in-service and continuing education program (*Schein*

*and Lawrence, 2005*). The shortage of resources and constant change of environmental conditions makes it necessary to monitor and evaluate the way of using resources more than ever (*Farzianpour et al., 2014*). Therefore, adopting new approaches for management and evaluation of health care services based on international standards is deemed crucial (*Joint Commission of Accreditation of Hospital, 2011*).

The measurement of quality is a systematic identification of the current level of quality the facility or system is achieving, and comparing it to expected standards. Hence, setting standards is an essential step towards evaluating the care delivery (*American Association of Critical Care Nurses, 2005*). Measuring quality leads to the identification of areas for improvement, which is the first step in improving quality (*Hill and Jones, 2008*).

The labor care is one of the pillars of safe motherhood interventions that is believed to reduce maternal and perinatal mortality if carried out properly. The purpose of obstetric care is to assure that every pregnancy culminates in the birth of a healthy baby without any impairment of the mother's health (*Ministry of Health and population, 2006*). In order to monitor and evaluate the quality of care in

labor wards, quality measures should be applied at the level of a team or service rather than to individual physicians. All members of the team, including physicians, nurses, and antenatal and postpartum caregivers, should be held accountable for results. Risk-adjusted complication rates of both vaginal and cesarean deliveries, including both maternal and fetal complications, could be measured and compared among settings (*Janakiraman and Ecker, 2010*).

In Egypt, trends in maternal health indicators have improved significantly since 1995. Regular antenatal care has raised from 28 % in 1995 to 66 % in 2008. Despite all these developments, there are still many gaps that demand further efforts and remain the main challenge to accomplishing national goals. Hence, measuring quality can be an important tool in assessing compliance with standards particularly that the efforts to measure quality of nursing care and nursing service are very limited. It was therefore important to investigate the quality of the labor wards in these selected hospitals to provide an overview of the current situation of the maternity services.

#### **Aim of the study**

The aim of this study was to measure the quality of nursing care in the labor wards of selected hospitals in Egypt.

## **2. Methodology**

### **Research design, setting, and materials:**

This record-based study was carried out in the labor wards of five hospitals in Egypt. They were selected to represent various sectors of health care system, namely University, Teaching, and Ministry of Health (MOH) sectors. The five hospitals were Zagazig University Hospital, Al-ahrar Teaching Hospital., Qena General Hospital, Belbeis General Hospital, and Qena University Hospital affiliated to the South-Valley University. The materials for the study consisted of the medical records of the labor wards of the five hospitals during the first decade of this century, i.e. 2001 to 2010. The records of Qena University Hospital covered only the last three years of this period, i.e. 2008 to 2010. Despite the short duration of the work in this hospital, it was selected to represent the South-Valley University, which is the newest one in Upper Egypt.

### **Data collection tools:**

The researchers designed two data collection sheets to abstract the necessary data from the records. The first sheet included the total number of deliveries by type during each of the ten years. It also collected data about the Adverse Outcomes Index indicators, which were given scores according to *Mann et al (2006)*. These are maternal deaths (750 points), intrapartum/neonatal death (>2.5 kg) (400 points), uterine rupture (100 points), maternal ICU admission

(65 points), birth trauma (60 points), return to OR/labor room (re-admission) (40 points), admission to NICU >2.5 kg, for >24 hrs (35 points), Apgar <7 at 5 min (25 points), blood transfusion (20 points), and perineal tear (grade 3-4) (5 points). The scores are summed-up for each year in each hospital and divided by the total number of deliveries in the same place and time to yield the Weighted Adverse Outcome Score (WAOS). A higher score denotes a lower quality of care.

The second sheet collected data about the setting. This included information about the number of patients, nursing staff (managers: director/assistants, head nurses, specialists with bachelor, staff nurses with diploma, and nurse interns), and physicians (consultants, specialists, residents, and house-officers). The data collection tools were reviewed by experts in Obstetric and Gynecological nursing for validation.

### **Fieldwork:**

Upon preparation of the data collection tools, they were reviewed by specialists for appropriateness and comprehensiveness. The researchers obtained the official permissions to conduct the study from the administration of the five hospitals. The data collected was anonymous and total confidentiality was ensured. The researchers collected the data consecutively through visiting the hospitals three days /week to fill-out the data collection sheets. The fieldwork lasted from July to December 2013.

### **Ethical considerations:**

An official permission was granted from the directors of the pre-mentioned settings. Each hospital director was informed about the purpose of the study then a written consent was obtained before starting the data collection. Confidentiality was ensured throughout the study process, and the directors were assured that all data would be used only for research purpose.

### **Statistical analysis:**

Statistical analysis was carried out using SPSS Release 19. The WAOS scores were calculated for each hospital each year, and means and standard deviations were computed. Spearman rank correlations were calculated for the relations between WAOS, birth trauma and perineal tear scores from one side, and the ratios of nurses, doctors, and women from the other side. The level of significance was set at  $p < 0.05$ .

## **3. Results**

Table 1 describes the ratios of healthcare providers to women in the study hospitals during the study period. It shows that Belbeis hospital had the highest nurse/woman and physician/woman ratios, but the lowest nurse/physician ratios.

Table 1: Ratios of healthcare providers to women in the study hospitals during the study period

Ratios		Hospitals					Total
		Zagazig	Al-ahrar	Qena Gen.	Belbeis	Qena Uni.	
Nurse/woman	Min	1.46	0.34	0.44	3.33	0.00	0.00
	Max	2.26	0.64	0.52	10.89	2.16	10.89
	Mean	1.99	0.46	0.47	5.95	1.29	2.20
	SD	0.28	0.11	0.03	2.51	0.79	2.42
Physician/woman	Min	0.43	0.18	0.22	5.17	0.00	0.00
	Max	0.64	0.36	0.26	15.35	1.08	15.35
	Mean	0.58	0.24	0.24	8.39	0.56	2.20
	SD	0.08	0.07	0.01	3.35	0.40	3.68
Nurse/physician	Min	3.31	1.76	1.89	0.65	2.00	0.65
	Max	3.55	2.18	2.33	0.74	3.18	3.55
	Mean	3.46	1.92	1.98	0.70	2.46	2.10
	SD	0.07	0.16	0.20	0.03	0.47	0.99
Staff nurses/ total nurses	Min	79.23	70.27	38.10	65.00	50.00	38.10
	Max	81.46	72.22	47.06	75.00	55.88	81.46
	Mean	80.42	70.66	45.27	67.35	52.57	65.84
	SD	0.71	0.82	4.01	2.99	2.10	12.04
House officers + residents/ Total physicians	Min	8.73	42.11	58.33	12.82	47.37	8.73
	Max	13.33	47.83	58.33	13.89	71.43	71.43
	Mean	11.12	45.26	58.33	13.48	55.73	33.40
	SD	1.12	2.59	0.00	0.26	10.41	20.85

Meanwhile, Al-ahrar hospital was the lowest in nurse/woman and physician /woman ratios. It is also noticed that Zagazig hospital had the highest nurse/physician ratio and the percent of staff nurse to total nurses, but the lowest percent of house officers + residents to total physicians. On the contrary, Qena general hospital was the lowest staff nurse/total nurses ratio, and the highest percent of house officers + residents to total physicians.

Table 2 and Figure 1 illustrate a wide variation in the Weighted Adverse Outcome Scores (WAOS) of the five study hospitals throughout the study years 2001 to 2010. Two of these hospitals (Zagazig University and Al-ahrar Teaching Hospitals) had generally stable scores all through the period, and all their scores were below the mean of the five hospitals. Moreover, while Zagazig Hospital scores had generally slightly increasing trend, Al-ahrar Hospital had a slightly decreasing trend. As for Qena General Hospital (QT), its scores were always high above the mean, with an abrupt increase from year 2007 to 2009. On the contrary, Belbeis General Hospital started with very high scores, but had a decreasing trend, and the scores reached below the mean by the year 2008 although it rose again in 2010. Lastly, Qena University Hospital shared only in the last 3 years of the study, and its rates were below the mean except for the year 2010. As the table indicates, the lowest mean WAOS was in year 2007 (48.98) while the highest was in the year 2003 (86.22). As for the hospitals, the maximum WAOS was scored by Qena General

Hospital in 2009 (211.82), whereas the lowest was from Zagazig University Hospital in 2002 (9.93).

As regards the birth trauma rates, Table 3 and Figure 2 demonstrate that only Qena General Hospital had all its rates during the study period higher than the corresponding means. Its rates were fluctuant and ranged between 57.76/1000 deliveries in 2006 to as high as 239.32/1000 deliveries in 2008. The corresponding range of the means was between 18.53/1000 deliveries in 2006 to 53.78/1000 deliveries in 2008. Meanwhile, the lowest rate was from Belbeis General Hospital (0.67/1000 deliveries in 2008).

The rates of perineal tear (3<sup>rd</sup> - 4<sup>th</sup> degrees) are displayed in Table 4 and Figure 3. As for birth trauma, all hospitals had their rates below the mean except for Belbeis General Hospital and Qena University hospital. The means ranged between 10.80/1000 deliveries in 2001 to 24.07/1000 deliveries in 2003. Meanwhile, the rates in Belbeis General Hospital ranged between 17.83/1000 deliveries in 2010 to 51.28/1000 deliveries in 2002, with generally low rates starting from 2007. The lowest rate was from Al-ahrar Teaching Hospital in 2002 where the rate was 0.0/1000 deliveries. No data on perineal tears were recorded in Qena General hospital during the study period.

Table 5 demonstrates statistically significant moderate positive correlations between WAOS scores and the number of nurses/woman, and the number of physicians/woman, but a negative correlation with the nurse/physician ratio. It also had a statistically

significant weak negative correlation with the percent of staff nurses to total nurses. Similarly, the birth trauma rate had statistically significant strong positive correlations with the number of nurses/woman, and the number of physicians/woman, but negative correlations with the nurse/physician ratio and the

percent of house-officers and residents/ total physicians. Meanwhile, the perineal tear rates had statistically significant moderate negative correlation with the percent of staff nurses to total nurses, and a weak positive correlation with the percent of house-officers and residents/ total physicians.

Table 2: Weighted Adverse Outcomes Score (WAOS) in the five study hospital throughout the study years (2001-2010)

Hospitals	Years									
	1	2	3	4	5	6	7	8	9	10
Zagazig Uni.	12.56	9.93	18.19	17.40	17.36	22.39	24.08	29.57	29.82	18.71
Al-ahrar teaching	19.13	29.06	27.75	28.22	20.54	18.83	18.57	18.77	14.52	18.80
Qena General	113.91	100.00	124.42	121.81	97.81	71.16	98.79	208.94	211.82	85.33
Belbeis General	107.14	205.87	212.93	114.50	90.12	100.76	54.48	54.20	57.35	71.07
Qena Uni.								53.10	53.02	56.14
MEAN	63.19	86.22	95.82	70.48	56.46	53.29	48.98	72.91	73.31	50.01

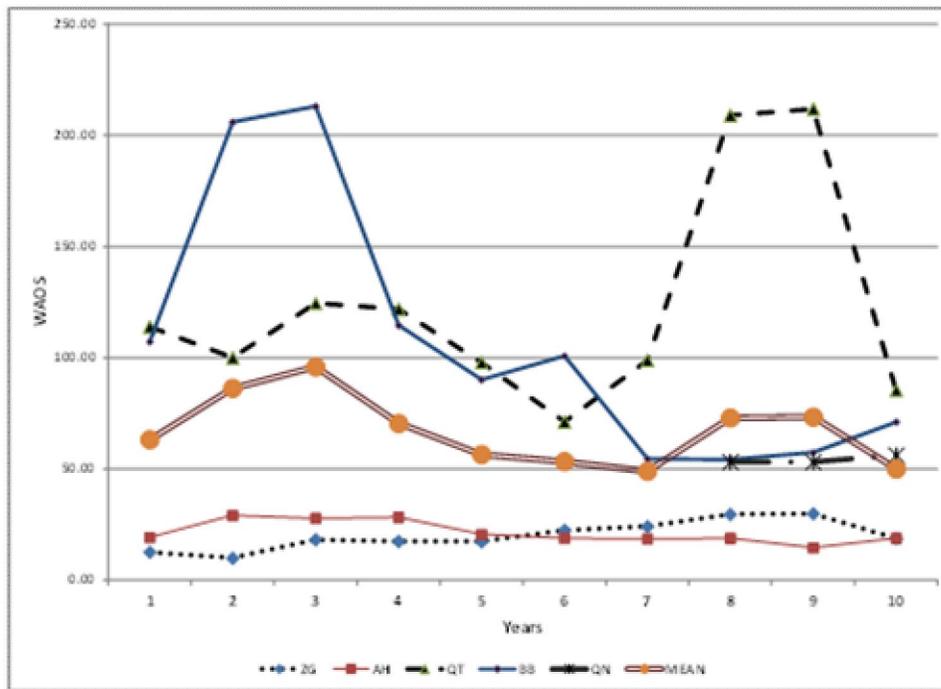


Figure 1: Weighted Adverse Outcomes Score (WAOS) in the five study hospital throughout the study years (2001-2010)

Table 3: Birth trauma rate (/1000 deliveries) in the five study hospital throughout the study years (2001-2010)

Hospitals	Years									
	1	2	3	4	5	6	7	8	9	10
Zagazig Uni.	3.25	6.99	8.84	10.76	8.42	8.12	8.89	6.56	7.22	5.57
Al-ahrar teaching	5.23	8.70	5.85	8.10	6.78	5.77	4.96	4.98	4.85	4.50
Qena General	88.71	104.84	120.44	116.18	127.12	57.76	99.66	239.32	184.00	64.94
Belbeis General	3.45	5.13	5.91	1.70	4.98	2.48	1.69	0.67	2.97	2.01
Qena Uni.								17.38	15.23	19.20
MEAN	25.16	31.41	35.26	34.19	36.83	18.53	28.80	53.78	42.85	19.24

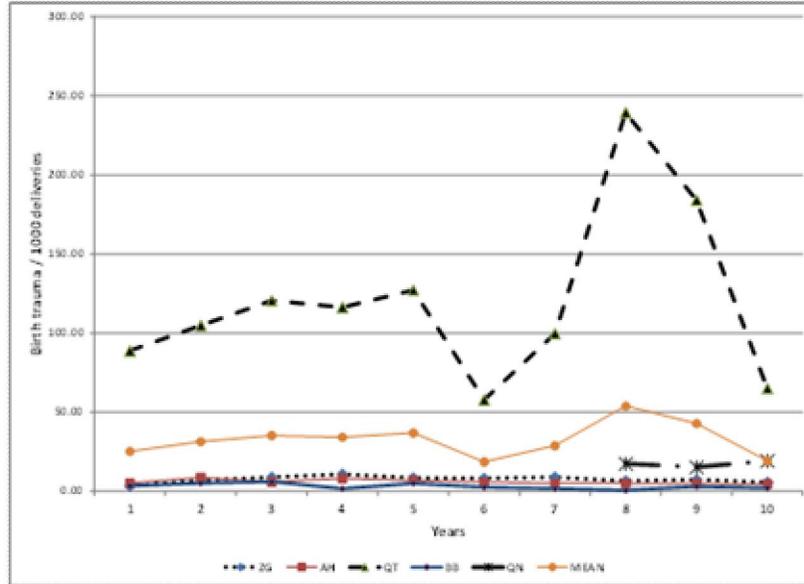


Figure 2: Birth trauma rate (/1000 deliveries) in the five study hospital throughout the study years (2001-2010)

Table 4: Perineal tear (3-4<sup>th</sup>) rate (/1000 deliveries) in the five study hospital throughout the study years (2001-2010)

Hospitals	Years									
	1	2	3	4	5	6	7	8	9	10
Zagazig Uni.	8.13	4.89	12.85	9.99	9.87	7.50	9.31	8.16	6.68	6.27
Al-ahrar teaching	7.03	0.00	11.20	8.80	7.46	6.99	8.04	7.55	5.47	7.88
Qena General										
Belbeis General	17.24	51.28	48.14	39.18	48.17	51.24	19.25	17.88	17.83	16.58
Qena Uni.								17.38	18.52	17.38
MEAN	10.80	18.72	24.07	19.32	21.83	21.91	12.20	12.74	12.13	12.03

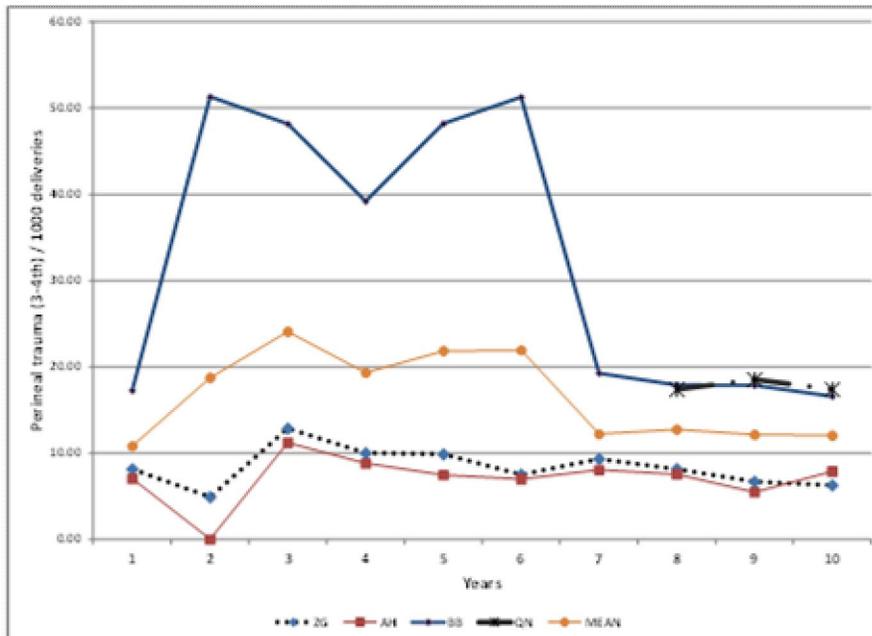


Figure 3: Perineal tear (3-4<sup>th</sup>) rate (/1000 deliveries) in the five study hospital throughout the study years (2001-2010)

Table 5: Correlation between quality obstetric care indicators and certain staffing indicators

	Pearson correlation coefficient		
	WAOS	Birth trauma	Perineal tear (3-4 <sup>th</sup> )
No. of nurses/woman	.62**	.94**	0.07
No. of physicians/woman	.65**	.98**	0.30
Nurse/physicians ratio	-.62**	-.70**	-0.23
% staff nurses / total nursing	-.38*	0.03	-.59**
% house-officers and residents / total physicians	-0.12	-.47**	.34*

(\*) Statistically significant at  $p < 0.05$ ;(\*\*) Statistically significant at  $p < 0.01$ 

#### 4. Discussion

Healthcare safety and quality are critically important issues in obstetrics, and society, healthcare providers, and patients share a common goal of working toward safer practice, and are continuously seeking strategies to facilitate improvements (Goffman *et al*, 2014). The present study aim was to assess the quality of nursing care in the labor wards of five different University, Teaching, and General Hospitals. The findings demonstrate generally wide discrepancies among the five hospitals in both staffing and quality indicators. These indicators are influenced by the staffing ratios.

According to the present study findings, the Weighted Adverse Outcome Scores (WAOS) – an indicator of the quality of care provided was lowest (indicating better quality) in Zagazig University and Al-ahrar Teaching Hospitals. On the contrary, the two general hospitals (Belbeis and Qena) had the highest scores, i.e. the lowest quality of care. This is certainly due to the differences in the facilities and staff qualifications in university and teaching hospitals compared with the general hospitals affiliated to the Ministry of Health (MOH). Similar discrepancies were reported among different obstetric stings in the Warded Kingdom (Rowe *et al*, 2014). The differences were related to settings' factors such as their size, the number of births, and the under staffing levels. On the same line, Choi and Boyle (2014) highlighted the importance of the nursing practice environment on the quality of care particularly in the wards that require the provision of 24-hour care to patients as the obstetric wards.

Moreover, the WAOS scores correlated positively with the nurses/woman and the physician/woman ratio, but negatively with the nurse/physician ratio. This means that a higher number of nurses relative to the number of physicians is more important in providing quality care compared with the numbers of each of the care providers' categories relative to the number of women. In confirmation of this, Zagazig hospital which was best in WAOS indicator had the highest nurse/physician ratio, whereas Belbeis hospital had the lowest nurse/physician ratio and had low quality of care as

indicated by the high WAOS scores. The findings confirm the importance of having a balanced mix of staff since neither the large numbers of nurses nor the large numbers of physicians help in quality care, but rather the suitable number of nurses per physician. Nonetheless, the WAOS scores found in the present study were way higher than those reported by Goffman *et al* (2014) in the Warded States; thus, the minimal rate in our study was 9.93 compared to their figures which ranged from 2.3 to 3.9.

The WAOS scores of the present study also demonstrated a negative correlation with the percent of staff nurses to total nurses. This means that having a larger number of staff nurses in the nursing team leads to better quality of service. This might be attributed to the more important role of staff nurses in the direct care provided to parturient women. In agreement with this, Chapman (2009) in a Warded States study reported that increasing the staff nurses was associated with less workload, which would increase nurses' job satisfaction with a positive impact on the quality of the care provided. Similar findings were also reported by Cho *et al* (2009) in a study in Korea.

The present study has also assessed the birth trauma rates in the five hospitals as one of the important indicators of the quality of care. The rates in Qena General Hospital were highest and way above the mean of the total sample. It reached a maximum of approximately one-fourth of the deliveries in the year 2008. This indicates a poor quality of care which might be explained by lack of experience in this hospital due to its location far from the capital, with less opportwardies of staff development. Similar findings were reported in Yemen (Al Serouri *et al*, 2009), Kenya (Ziraba *et al*, 2009), and Malawi Chodzaza and Bultemeier (2010) where the quality of obstetric care was rated as poor and this was attributed to inadequate resources and staffing, poor teamwork, and low knowledge and lack of supervision. A same situation was demonstrated by Jayanna *et al* (2014) in a study in India and thus they recommended improving providers' obstetric care skills, with strengthening of their clinical and problem solving

abilities, but this should be backed by streamline adequate staffing.

Meanwhile, the birth trauma rate correlated negatively with the nurse/physician ratio and the percent of house-officers and residents/ total physicians. The findings again indicate the importance of having adequate numbers of nurses relative to the number of physicians. Moreover, it shows the importance of house-officers and residents in decreasing the rates of birth trauma. This might be attributed to the longer time they provide in attending the parturient women compared with consultants and specialists. In fact, the process of labor needs constant care and observation, which may be better provided by junior rather than senior staff. In congruence with this, *Hodnett and Withdra (2008)* in a study in Canada highlighted the importance of the continuity of care in pregnancy and labor in improving maternal and fetal outcomes.

As regards the rates of 3<sup>rd</sup> - 4<sup>th</sup> degrees perineal tear, the current study results indicated that the rates from Belbeis General and Qena University hospitals had rates above the mean, with better rates starting from year 2007. The high rate in Belbeis hospital might be attributed to its low nurse physician ratio. In line with this, *Riley et al (2011)* in a study in the Warded States demonstrated the importance of teamwork in the prevention of perineal trauma. The authors showed the effectiveness of a comprehensive interdisciplinary training in improving perinatal outcomes and thus recommended it.

The rates of perineal tears in the present study showed also negative correlations with the percent of staff nurses to total nurses, and of house-officers and residents/ total physicians. This again indicates that the presence of a relatively high percent of junior staff, both in nursing and medicine, is important in preventing such untoward outcomes of labor. Their roles in supporting parturient women and at the same time in helping senior staff during the process of delivery is thus essential.

### Conclusion and Recommendations

The present study findings indicate that the quality of care provided to parturient women is better in University and Teaching hospitals compared to the general hospitals affiliated to the MOH. An adequate staff mix is important in improving the quality of service, with lower rates of birth trauma and perineal tear. Nonetheless, the study findings should be interpreted taking into consideration the limitations of record-based studies such as the lack of accuracy, incompleteness, and over- or under-reporting. It is recommended that the hospitals increase their nurse/physician ratios, and to have suitable percentages of junior nurses and physicians compared

to senior staff. Moreover, the hospitals should keep good records so that the use of WAOS as an indicator of quality be possible.

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